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10/595,166

03/15/2006

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EXAMINER

BENITEZ, JOSHUA

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/595,166 | Applicant(s) PITKARY ET AL. | |
| | Examiner JOSHUA BENITEZ | Art Unit 2829 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/04/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-23 of U.S. Application No. 10/595,166 filed on 03/15/2006 are presented for examination.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 12/04/2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "1" has been used to designate both upper layer, shortage, current leakage, thick copper conductor, open channel, a measurement point and the get info from CAM system step in figures 1, 2, 3, 4, 56B and 7 respectively. The other reference characters are also used throughout the figures to designate different elements. Applicant is kindly reminded that the same reference character can only be used in different drawings if it designates the same element. Different elements even when present in different figures require different reference characters. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the

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filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claims 12-23 are objected to because of the following informalities:

In claim 12, line 2, "said method comprising the steps of:" should be replaced with "comprising:" since the claim refers to a system and not a method.

Claims 13-23 are also objected for depending on claim 12

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 6-10, 12-15 and 17-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Borden et al (U.S. Patent No. 6,971,791).

In re claim 1, Borden '791 discloses a method of testing a PCB by checking energy diffusion through board tracks (col. 7, lines 4-13, 56-61), said method comprising the steps of:

applying heat energy at entrance ports of the PCB (col. 7, lines 36-43);

measuring in time domain the rate of energy diffusion along the tracks of the board at the terminating ports (col. 7, lines 43-48), since using a Fourier transform indicates that the signal was originally measured in the time domain and had to be transformed to the frequency domain to analyze it;

comparing said measurements with pre-memorized values of a group of patterns that represent respective golden board results (col. 8, lines 64-68 to col. 9, lines 1-4);

analyzing defects automatically on the basis of learned defect test patterns (col. 8, lines 17-22).

Regarding claim 2, Borden '791 discloses the measurement conducted in different frequencies bands (col. 10, lines 9-32).

With respect to claim 3, Borden '791 discloses the DUT is before assembly (col. 6, lines 44-48).

As for claim 4, Borden '791 discloses the DUT is after assembly (col. 6, lines 44-48).

In re claims 6 and 8, Borden '791 discloses the measurements are conducted at more than one port simultaneously (col. 9, lines 57-60).

With respect to claim 7, Borden '791 discloses the analysis process enable to identify the defect type according to the respective pattern (col. 11, lines 33-44, col. 12, lines 25-28).

Regarding claim 9, Borden '791 discloses the heating process duration is determined in accordance with the heating source type and DUT material (col. 10, lines 18-32, col. 11, lines 6-32).

As for claim 10, Borden '791 discloses the golden board is a pre analyzed perfect PCB (col. 6, lines 49-52).

In re claim 12, Borden '791 discloses in figures 15-16 a system (1300) for testing a PCB (1316) by checking energy diffusion through board tracks comprising:

controlled heat energy source (1301, 1321) for applying heat at certain ports of the PCM (entry ports) (col. 7, lines 36-43);

thermal imaging means (1305, 1307, 1309, 1310, 1311, 1312, 1319, 1320, 1324, 1325) for measuring in time domain the rate of energy diffusion along the tracks of the board at terminating ports (col. 13, lines 40-67 to col. 14, lines 1-6);

processing means (1412, fig. 16) for comparing said measurements with prememorized values of a group of patterns that represent respective golden board results and analyzing defects automatically on the basis of learned defect test patterns (col. 8, lines 17-22).

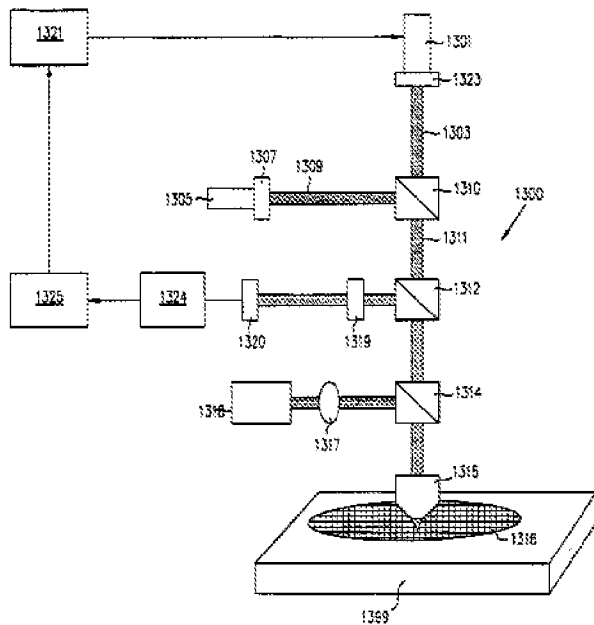


FIG. 15

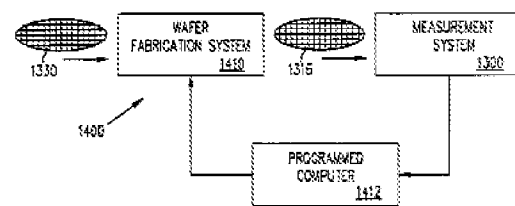


FIG. 16

Regarding claim 13, Borden '791 discloses the measurement conducted in different frequencies bands (col. 10, lines 9-32).

With respect to claim 14, Borden '791 discloses the DUT is before assembly (col. 6, lines 44-48).

As for claim 15, Borden '791 discloses the DUT is after assembly (col. 6, lines 44-48).

In re claims 17 and 20, Borden '791 discloses the measurements are conducted at more than one port simultaneously (col. 9, lines 57-60).

As for claim 18, Borden '791 discloses the measurement including a thermal map as shown in figure 33.

With respect to claim 19, Borden '791 discloses the analysis process enable to identify the defect type according to the respective pattern (col. 11, lines 33-44, col. 12, lines 25-28).

Regarding claim 21, Borden '791 discloses the heating process duration is determined in accordance with the heating source type and DUT material (col. 10, lines 18-32, col. 11, lines 6-32).

As for claim 22, Borden '791 discloses the golden board is a pre analyzed perfect PCB (col. 6, lines 49-52).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 11, 16 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borden '791.

In re claims 5 and 16, Borden '791 discloses the claimed invention except for specifically disclosing the measurements are consecutive, heating a single port at a time.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have performed a consecutive measurement heating a single port at a time in order to perform a more reliable and specific test that concentrates on a full analysis of a single point reducing the probability to not detect a defective point by testing multiple at a time.

Regarding claims 11 and 23, Borden '791 discloses the claimed invention except for specifically disclosing the golden board as a simulated PCB.

However, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have provided a golden board as a simulated PCB instead of an actual pre analyzed perfect PCB in order to ensure that the reference values to compare the DUT with are correct values and avoid the possibility of having an incorrect reference value from an actual physical PCB that was undetected by the system.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Schlagheck et al (U.S. PGPub No. 2002/0167987) discloses a mechanism for detecting a defect in a populated sample performing a method comprising directing a thermal wave at the sample, recording a thermographic image and analyzing the obtained thermographic image by comparing it with a standard thermographic image.

Schlagheck et al (U.S. Patent No. 6,840,667) discloses a method and apparatus for inspecting an object and detecting defects by injecting a thermal stimulation on the object, capturing a sequence of consecutive infrared images of the object to record heat diffusion resulting from the heat pulse, comparing the heat diffusion on said object to a reference and determining whether the object comprises any defects.

Goruganthu et al (U.S. Patent No. 6,430,728) discloses a system and method of analyzing an integrated circuit by directing a laser to the back side of an integrated circuit and causing local heating which generates acoustic energy in the circuit.

Plaff et al (U.S. Patent No. 6,512,385) discloses a method for testing a device under test comprising providing a beam of coherent light from a light source having a first wave length and imposing the beam of light on a test device over a spatial region within the test device.

Borden et al (U.S. Patent No. 6,049,220) discloses an apparatus and method for measuring a wafer comprising illuminating the wafer with two beams to extract information about the semiconductor material.

Piwonka-Corle et al (U.S. Patent No. 5,608,526) discloses a method and system employing reflective optics to measure a small region of a sample by reflecting radiation from the region.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSHUA BENITEZ whose telephone number is (571)270-1435. The examiner can normally be reached on M-Th, 7:30-5:00; F, 7:30-4:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on 571-272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. B./
Examiner, Art Unit 2829
June 6, 2008

/Ha T. Nguyen/
Supervisory Patent Examiner, Art Unit 2829